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| 10/606,924 | 06/26/2003 | Pieter van Rooyen | 16100US02 | 3857 |
| 23446 7590 04/09/2008 MCANDREWS HELD & MALLOY, LTD 500 WEST MADISON STREET SUITE 3400 CHICAGO, IL 60661 | | | EXAMINER AHN, SAM K | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/606,924

Applicant(s)

ROOYEN ET AL.

Examiner

SAM K. AHN

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2008.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 38-57 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 38-57 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 26 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date 030508
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance or after an Office action under *Ex Parte Quayle*, 25 USPQ 74, 453 O.G. 213 (Comm'r Pat. 1935). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on 03/05/08 has been entered.

Claim Objections

2. Claims 38-57 are objected to because of the following informalities:
In claims 38 and 46, define "QPSK" and "MTCM". Claims 39-45 and 47-57 depend on the objected claims. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 38,41 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lewen et al. JP 2002135134 (Lewen, cited in the IDS) in view of Jia et al. US 2003/0072395 A1 (Jia).

Regarding claim 38, Lewen teaches a wireless mobile cellular phone having a plurality of antennas (see Fig.2), comprising:

a QPSK mapper configured to receive input data (52 in Fig.8);

a first MTCM encoder and QPSK mapper unit operatively coupled to the QPSK mapper (53);

a first symbol selector and puncturer operatively coupled to the first MTCM encoder and QPSK mapper unit, the first symbol selector and puncturer being configured to provide a first channel-coded symbol stream (510);

a symbol interleaver operatively coupled to the QPSK mapper (54);

a second MTCM encoder and QPSK mapper unit operatively coupled to the symbol interleaver (55);

a symbol de-interleaver arrangement operatively coupled to the second MTCM encoder and QPSK mapper unit (56,57);

a second symbol selector and puncturer operatively coupled to the symbol de-interleaver arrangement, the second symbol selector and puncturer being configured to provide a second channel-coded symbol stream (59); and

an encoder operatively coupled to the first symbol selector and puncturer and to the second symbol selector and puncturer, the encoder being configured to receive the first channel-coded symbol stream and the second channel-coded symbol stream,

the encoder providing space-time coding to the first channel-coded symbol stream and to the second channel-coded symbol stream, the encoder generating a first space-time-channel-coded symbol stream and a second space-time-channel-coded symbol stream (encoder coupled to 58,59 in Fig.8).

However, Lewen does not teach wherein the wireless mobile cellular phone supports orthogonal frequency division multiplexing.

Jia teaches a wireless mobile cellular phone supports orthogonal frequency division multiplexing (mobile station employing OFDM, note paragraph 0012). Jia further suggests that through OFDM, or MIMO- OFDM, provided the system to deliver high-speed data over a multi-path fading channel (note paragraph 0012). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate the teaching of Jia in the system of Lewen of employing OFDM or MIMO-OFDM for the purpose of providing the system to deliver high-speed data over a multi-path fading channel (note paragraph 0012).

Regarding claim 41, Lewen further teaches wherein the wireless mobile cellular phone supports spread spectrum modulation (note description referring to Figs.2 and 3 of implementing spread spectrum).

Regarding claim 45, Lewen further teaches wherein the symbol de-interleaver arrangement comprises a plurality of symbol de-interleavers (56,57).

4. Claims 39 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lewen et al. JP 2002135134 (Lewen) in view of Jia et al. US 2003/0072395 A1 (Jia) and Applicants' Admitted Prior Art (AAPA).

Regarding claim 39, Lewen in view of Jia teaches all subject matter claimed, as applied to claim 38, however, does not teach wherein the wireless spread spectrum mobile cellular phone supports redundant non-binary modulation in combination with a finite-state encoder.

AAPA teaches wherein the wireless spread spectrum mobile cellular phone supports redundant non-binary modulation in combination with a finite-state encoder (note page 2, lines 19-21). AAPA suggests that this implementation improves robustness of the transmission with coding gain by 3 dB (note p.2, lines 21-25). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate the teaching of AAPA in the system of Lewen in view of Jia for the purpose of further improving the system of the transmission with coding gain by 3 dB (note p.2, lines 21-25).

Regarding claim 44, AAPA further teaches wherein the wireless mobile cellular phone supports a Universal Mobile Telecommunications System mobile communications device (p.1, l.30).

5. Claims 40,42 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lewen et al. JP 2002135134 (Lewen) in view of Jia et al. US 2003/0072395 A1 (Jia) and Zhao US 2003/0040331 A1.

Regarding claim 40, Lewen in view of Jia teaches all subject matter claimed, as applied to claim 38. Lewen teaches supporting CDMA (note paragraph 0003) and voice communication (wherein one skilled in the art would recognize that CDMA implementation is to support voice). However, Lewen and Jia do not explicitly teach supporting.

Zhao teaches a mobile station supporting multimedia communications (paragraph 0025) and navigational communications (note paragraph 0044). One skilled in the art would recognize that supporting different types of communications increases flexibility of the system, hence increase overall usability of the system.

Regarding claim 42, the claim is rejected as applied to claim 40 with similar scope.
Regarding claim 43, the claim is rejected as applied to claim 40 with similar scope.

6. Claims 46,48,49 and 54-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lewen et al. JP 2002135134 (Lewen) in view of Zhao US 2003/0040331 A1.

Regarding claim 46, Lewen teaches a wireless mobile cellular phone having a plurality of antennas (see Fig.2), comprising:

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a QPSK mapper configured to receive input data (52 in Fig.8);

a first MTCM encoder and QPSK mapper unit operatively coupled to the QPSK mapper (53);

a first symbol selector and puncturer operatively coupled to the first MTCM encoder and QPSK mapper unit, the first symbol selector and puncturer being configured to provide a first channel-coded symbol stream (510);

a symbol interleaver operatively coupled to the QPSK mapper (54);

a second MTCM encoder and QPSK mapper unit operatively coupled to the symbol interleaver (55);

a symbol de-interleaver arrangement operatively coupled to the second MTCM encoder and QPSK mapper unit (56,57);

a second symbol selector and puncturer operatively coupled to the symbol de-interleaver arrangement, the second symbol selector and puncturer being configured to provide a second channel-coded symbol stream (59); and

an encoder operatively coupled to the first symbol selector and puncturer and to the second symbol selector and puncturer, the encoder being configured to receive the first channel-coded symbol stream and the second channel-coded symbol stream, the encoder providing space-time coding to the first channel-coded symbol stream and to the second channel-coded symbol stream, the encoder generating a first space-time-channel-coded symbol stream and a second space-time-channel-coded symbol stream (encoder coupled to 58,59 in Fig.8).

Lewen teaches supporting CDMA (note paragraph 0003) and voice communication (wherein one skilled in the art would recognize that CDMA implementation is to support voice). However, Lewen does not explicitly teach supporting.

Zhao teaches a mobile station supporting multimedia communications (paragraph 0025) and navigational communications (note paragraph 0044). One skilled in the art would recognize that supporting different types of communications increases flexibility of the system, hence increase overall usability of the system.

Regarding claim 48, Lewen further teaches wherein the QPSK mapper, the first MTCM encoder and QPSK mapper unit, the first symbol selector and puncturer, the symbol interleaver, the second MTCM encoder and QPSK mapper unit, the symbol de-interleaver arrangement, the second symbol selector and puncturer and the encoder are part of one or more wireless transmitters (see transmitter in Fig. 7).

Regarding claim 49, the claim is rejected as applied to claim 46 with similar scope.

Regarding claim 54, Lewen further teaches wherein the wireless spread spectrum mobile cellular phone supports space-time turbo-coded modulation (note paragraph 0104).

Regarding claim 55, Lewen further teaches wherein the wireless spread spectrum mobile cellular phone supports block space-time coding (note paragraphs 0104 and 0075).

Regarding claim 56, Lewen further teaches wherein the wireless spread spectrum mobile cellular phone supports convolutional space-time coding (note paragraph 0027).

7. Claims 47,51 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lewen et al. JP 2002135134 (Lewen) in view of Zhao US 2003/0040331 A1 and Applicants' Admitted Prior Art (AAPA).

Regarding claim 47, Lewen in view of Zhao teaches all subject matter claimed, as applied to claim 46, however, does not teach wherein the wireless spread spectrum mobile cellular phone supports redundant non-binary modulation in combination with a finite-state encoder.

AAPA teaches wherein the wireless spread spectrum mobile cellular phone supports redundant non-binary modulation in combination with a finite-state encoder (note page 2, lines 19-21). AAPA suggests that this implementation improves robustness of the transmission with coding gain by 3 dB (note p.2, lines 21-25). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate the teaching of AAPA in the system of Lewen in view of Zhao for the

purpose of further improving the system of the transmission with coding gain by 3 dB (note p.2, lines 21-25).

Regarding claim 51, AAPA further teaches wherein the wireless mobile cellular phone supports a Universal Mobile Telecommunications System mobile communications device (p.1, l.30).

Regarding claim 52, the claim is rejected as applied to claim 47 with similar scope.

8. Claim 50 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lewen et al. JP 2002135134 (Lewen) in view of Zhao US 2003/0040331 A1 and Jia et al. US 2003/0072395 A1 (Jia).

Regarding claim 50, Lewen in view of Zhao teaches all as applied to claim 46. However, Lewen does not teach wherein the wireless mobile cellular phone supports orthogonal frequency division multiplexing.

Jia teaches a wireless mobile cellular phone supports orthogonal frequency division multiplexing (mobile station employing OFDM, note paragraph 0012). Jia further suggests that through OFDM, or MIMO- OFDM, provided the system to deliver high-speed data over a multi-path fading channel (note paragraph 0012). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate the teaching of Jia in the system of Lewen of employing OFDM or

MIMO-OFDM for the purpose of providing the system to deliver high-speed data over a multi-path fading channel (note paragraph 0012).

9. Claim 53 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lewen et al. JP 2002135134 (Lewen) in view of Zhao US 2003/0040331 A1 and Angus US 2002/0080008 A1.

Regarding claim 53, Lewen in view of Zhao teaches all subject matter claimed, as applied to claim 46, however, do not teach wherein the wireless spread spectrum mobile cellular phone supports telemetry communication systems.

Angus teaches a wireless spread spectrum mobile cellular phone supports telemetry communication systems (note paragraph 0032). Angus further suggests that transferring of data measured or recorded may be implemented using telemetry communication system (note paragraph 0032). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate the teaching of Angus in the system of Lewen and Zhao for the purpose of transferring of data measured or recorded may be implemented using telemetry communication system (note paragraph 0032).

10. Claim 57 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lewen et al. JP 2002135134 (Lewen) in view of Zhao US 2003/0040331 A1 and Hiramatsu US 7,003,324 B2.

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Regarding claim 57, Lewen in view of Zhao teaches all subject matter claimed, as applied to claim 46, however, do not teach wherein the plurality of antennas are arranged so that a fading correlation between the antennas is below 0.5.

Hiramatsu teaches wherein plurality of antennas are arranged so that a fading correlation between the antennas is below 0.5 (implementing method 2 thus having fading correlation to be virtually 0, note c.1, l.51-52). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to incorporate the teaching of Hiramatsu in the system Lewen and Zhao of arranging the plurality of antennas using method 2 of Hiramatsu in order to better obtain signals received.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sam Ahn whose telephone number is (571) 272-3044. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sam K. Ahn/
Primary Examiner, Art Unit 2611

4/8/2008